

## Claims

1. A peritoneal dialysis sampling system to be used together with a peritoneal dialysis system which is programmed to deliver fluid to a peritoneal cavity of a patient and to drain the fluid from the cavity, said peritoneal dialysis system comprising a supplying line and supplying means for supplying dialysis fluid to the peritoneal cavity, a draining line and draining means for draining the fluid from the cavity, said peritoneal dialysis sampling system being characterized by the fact that it consists of an automatic sampling system which is able to automatically sample volumic fractions of the dialysate contained in the peritoneum of the patient at specific time intervals in order to evaluate the peritoneal membrane characteristics and/or improve the peritoneal dialysis for a given patient.
2. Automatic peritoneal dialysis sampling system according to claim 1 furthermore comprising means for defining the specific time intervals for sampling volumic fractions in relation with the peritoneal dialysis program sequences in order to better evaluate the peritoneal membrane characteristics and/or improve the peritoneal dialysis for a given patient..
3. Automatic peritoneal dialysis sampling system according to any of the previous claims furthermore comprising means for allowing the use of different peritoneal dialysis liquids and/or different concentrations for each exchange cycle.
4. Automatic peritoneal dialysis sampling system according to any of the previous claims furthermore comprising connecting means for allowing a connection to a Y-site on the draining which is situated between the patient peritoneum and the draining means of the peritoneal dialysis system in order to collect samples at different intervals independently of the drain cycles.

5 5. Automatic peritoneal dialysis sampling system according to claim 4 furthermore comprising means for allowing the automatic sampling during the dwell time of the peritoneal dialysis cycle and/or during the drain cycle in order to improve the evaluation of the peritoneal membrane characteristics and/or improve the peritoneal dialysis for a given patient.

10 6. Automatic peritoneal dialysis sampling system according to any of the claim 4 or 5 wherein it comprises a series of sampling containers, pumping means and a series of valves in order to direct a certain quantity of each fluid sample to a given sampling container.

15 7. Automatic peritoneal dialysis sampling system according to the previous claim wherein said pumping means is of a peristaltic type.

20 8. Automatic peritoneal dialysis sampling system according to any of the claims 1 to 3 furthermore comprising connecting means for connecting it to the draining line between the draining means and a waste collector in order to collect samples of specific drain cycles.

25 9. Automatic peritoneal dialysis sampling system according to claim 8 wherein the automatic peritoneal dialysis system is composed of a series of valves which are controlled by an electronic system in order to direct a certain quantity of each fluid sample to a specific sampling container.

30 10. Automatic peritoneal dialysis sampling system according to claim 9 wherein the valves of such automatic peritoneal dialysis sampling system are controlled by the automatic peritoneal dialysis system in order to open and close at specific time intervals in relation with the peritoneal dialysis cycles.

35 11. Automatic peritoneal dialysis sampling system according to any of the claims 6 or 9, wherein the valves are of an electromagnetic type.

5 12. Automatic peritoneal dialysis sampling system according to any of the previous claims furthermore comprising means for eliminating a volume of liquid between two samplings at least equivalent to the dead volume contained between the patient and the sampling level.

10 13. Peritoneal dialysis system including an automatic peritoneal dialysis sampling system according to any of the previous claims furthermore comprising an automatic peritoneal dialysis exchange system, both automatic peritoneal dialysis sampling system and automatic peritoneal dialysis exchange system being connected to the patient peritoneum and

15 comprising means for exchanging information together in order for the automatic peritoneal dialysis sampling system to determine the appropriate timing for each sampling on the basis of the dialysis exchange cycles of the automatic peritoneal dialysis exchange system.

20 14. Peritoneal dialysis sampling system according to the previous claim wherein both automatic peritoneal dialysis sampling system and automatic peritoneal dialysis exchange system are similar systems which are synchronized and which are working with different software and fluidic connections.

25 15. Automatic peritoneal dialysis sampling system according to any of the previous claims wherein it comprises a memory key which contains all the necessary data to program the functioning of said automatic peritoneal dialysis sampling system and to store the sampling information.

30 16. Automatic peritoneal dialysis sampling system according to any of the previous claims wherein sampling containers consist of soft pouches.

17. Automatic peritoneal dialysis sampling system according to any of the previous claims 1 to 15, wherein sampling containers consist of containers with vacuum in order to draw the liquid automatically when in open connection with the drawing line.

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5 18. Automatic peritoneal dialysis sampling system according to any of the claims  
1 to 15, furthermore comprising means for sequentially collecting sample  
volumes in a tubing, each sample being separated from the previous one by  
an air bubble inserted by the automatic peritoneal sampling system in-  
between each sample.

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19. Automatic peritoneal dialysis sampling system according to any of the  
previous claims 6 to 18 wherein said sampling containers are enclosed  
inside a cooling box which comprises cooling means to maintain the  
samples in optimal condition for storage until analysis.

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20. Automatic peritoneal dialysis sampling system according to any of the  
previous claims wherein it comprises analyzing means for directly analyzing  
of at least one characteristic of the sample in-line, such as by spectroscopy,  
fluorometry or by use of chemical or electro-chemical means.

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21. Automatic peritoneal dialysis sampling system according to the previous  
claim wherein said analyzing means allow the measurement of at least one  
of the following constituents or characteristics : glucose, urea, creatinine,  
Sodium, Chloride, albumine, proteins, osmolarity or ph.

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22. Method of use of the automatic peritoneal dialysis sampling system  
according to any of the previous claims 20 or 21 wherein the result of the in-  
line analysis is used to optimize the next peritoneal dialysis exchange cycle  
or sampling intervals in order to improve the membrane characteristics  
30 evaluation and/or improve the peritoneal dialysis for a given patient.

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23. Method of use of the automatic peritoneal dialysis sampling system  
according to any of the previous claims wherein the specific time intervals  
for sampling volumic fractions are defined in relation with the peritoneal  
dialysis program sequences in order to better evaluate the peritoneal  
membrane characteristics and/or improve the peritoneal dialysis for a given  
patient.

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24. Method of use of the automatic peritoneal dialysis system according to any of the claims 1 to 22 wherein different peritoneal dialysis liquids and/or different concentrations are used for each exchange cycle, whether it is a tidal exchange or a full exchange cycle.

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25. Method of use of the automatic peritoneal dialysis system according to any of the previous claims, wherein the automatic sampling occurs during the dwell time of the peritoneal dialysis cycle and/or during the drain cycle in order to improve the evaluation of the peritoneal membrane characteristics and/or improve the peritoneal dialysis for a given patient.

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26. Method of use of the automatic peritoneal dialysis system according to any of the claims 1 to 21 wherein a volume of liquid at least equivalent to the dead volume contained between the patient and the sampling level is eliminated between two samplings.

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27. Method of use of the automatic peritoneal dialysis system according to any of the claims 1 to 15 and 18 to 21, wherein the sampling volumes are sequentially collected in a tubing, each sample being separated from the previous one by an air bubble inserted by the automatic peritoneal sampling system in-between each sample.

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28. Method of use of the automatic peritoneal dialysis system according to any of the claims 1 to 21 wherein the samples are directly analyzed in-line, such as by spectrometric, fluorometric, electro-chemical or chemical means.

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29. Method of use according to the previous claim wherein the result of the in-line analysis is used to optimize the next peritoneal dialysis exchange cycle or sampling intervals in order to improve the membrane characteristics evaluation and/or improve the peritoneal dialysis for a given patient.